



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,244	10/24/2003	Takatoshi Tsujimura	CMO.0012US (92096US)	1416

21906 7590 07/22/2005

TROP PRUNER & HU, PC  
8554 KATY FREEWAY  
SUITE 100  
HOUSTON, TX 77024

EXAMINER

TUROC, DAVID P

ART UNIT

PAPER NUMBER

1762

DATE MAILED: 07/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/693,244

Applicant(s)

TSUJIMURA ET AL.

Examiner

David Turocy

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 19-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Claims 19-25 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 6/16/2005.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 5 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5: There appears to be a typographical error in line 2 at "SiH<sub>3</sub>", which more appropriately should read "SiH<sub>4</sub>".

Claim 18: The phrase "at least up to 1 nm" is indefinite. It is unclear whether the dimension should be up to 1 nm or at least 1 nm. For the purposes of applying art the examiner is going to interpret the phrase as "up to 1 nm".

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 1762

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-13 and 15-17 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent US Patent 5686349 by Nakata, hereafter Nakata.

Nakata teaches a method of forming a microcrystalline thin film comprising a first process of supplying  $\text{SiH}_4$  and  $\text{H}_2$  comprising gases into a chamber with a substrate, a second process of supplying  $\text{H}_2$  alone to the chamber and repeating the first and second process a plurality of times without removing the substrate from the chamber (Abstract, Example 1). Nakata discloses supplying  $\text{H}_2$  at a constant rate during both the first and second process and  $\text{SiH}_4$  has a first rate during the first process and is not supplied during the second process (Example 1).

Nakata fails to explicitly teach of converting the  $\text{SiH}_4$  to  $\text{SiH}_2$ , which contains a polymer forming element, by the application of the electric field. However, as evidenced by the admitted state of the art discloses when applying a high-energy electric field to the  $\text{SiH}_4$  is broken down into a more reactive  $\text{SiH}_2$ , which may form a polymer by bonding to each other (Specification Page 3). In addition a flow ratio and an electric field density, which satisfy the relationship as, taught by claim 13, must necessarily result in the formation of the polymer forming  $\text{SiH}_2$ .

Nakata teaches of supplying the gases with a flow rate ratio,  $r$ , equal to 100 and an electric field intensity,  $P$ , of  $1000 \text{ mW/Cm}^2$ , which satisfies the relationship as claimed (Example 1).

Therefore, the prior art and the present claims, reflected by claim 4 and 13, teach all the same process steps and thus the results obtained by applicants process must necessarily be the same as those obtained by the prior art. Therefore by applying an electric field in the chamber with  $\text{SiH}_4$  and  $\text{H}_2$ , with a flow rate ratio and electric intensity satisfying the claimed relationship, it must necessarily result in breaking the  $\text{SiH}_4$  to a third gas  $\text{SiH}_2$ , or activating the source gas to contain an element which forms a polymer due to bonding. Either 1) the applicant and the prior art have different definitions of applying an high-intensity electric field, or 2) the applicant is using other process steps or parameters that are not shown in the claims.

While the examiner notes the process as taught by Nakata does not teach of depositing a third gas,  $\text{SiH}_2$ , to a surface of the substrate in the second step, it is the examiners position that after stopping the flow of  $\text{SiH}_4$ , the process of Nakata inherently results in at least a quantitative amount of continual deposition of  $\text{SiH}_2$ , during the second step, at which  $\text{H}_2$  is maintained at a constant rate, due to the presence of  $\text{SiH}_4$  and  $\text{H}_2$  remaining in the process chamber.

Art Unit: 1762

Claim 8 and 10: The prior art and the present claims, reflected by claim 8, teach all the same process steps and thus the results obtained by applicants process must necessarily be the same as those obtained by the prior art. Therefore by supplying the second gas during a portion of the deposition of the third gas, it must necessarily result in reduction of formation of the polymer of the third gas prior to deposition. Either 1) the applicant and the prior art have different definitions of depositing the third gas during the second process without the first process gas, or 2) the applicant is using other process steps or parameters that are not shown in the claims.

Claim 17: Nakata teaches of a method of manufacturing a thin film transistor by forming a gate electrode, forming an insulation layer on the gat electrode and forming a channel layer film on the insulation layer by using the microcrystalline thin film forming method of claim 9 and then subsequently forming a source electrode on the channel layer (Column 3, lines 14-45).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

Art Unit: 1762

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata.

Claim 14: Nakata teaches all the limitations of this claim as applied to claim 9 above, however, they fail to disclose a supplying process of 2 seconds or less and the source deposition process longer than the source supplying process. However, it is the examiner's position that the process parameter of time is a known result effective variable. If time were low it would result in insufficient film thickness and too much time would result in a larger film thickness than desired.

Therefore it would have been obvious to one skilled in the art at the time of the invention was made to determine the optimal value for the time for the source supplying process and the deposition process used in the process of Nakata in view of the admitted state of the art as taught by the applicant's description, through routine experimentation, to impart the substrate with the desired film thickness.

Claim 18: Nakata teaches all the limitations of this claim as applied to claim 9 above, however, they fail to explicitly disclose the claimed distance for the microcrystalline film from the insulation layer. However, Nakata discloses a portion of the channel layer comprises a microcrystalline thin film less than 500 angstroms from the insulation layer (Column 3, lines 14-45). In the case where the claimed ranges "overlap or lie" inside ranges disclosed by prior art a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257 191 USPQ 90. See MPEP 2144.05.

### **Conclusion**

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent 6271062 by Nakata et al teaches of a similar process, in particular Nakata teaches of continuously depositing the microcrystalline film without a hydrogen plasma treatment (See column 11, lines 9-30).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Art Unit: 1762

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Turocy  
AU 1762



**TIMOTHY MEEKS**  
**SUPERVISORY PATENT EXAMINER**